Your Ultimate Source for OEM Repair Manuals

FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

2011 FORD Mustang Convertible OEM Service and Repair Workshop Manual

Go to manual page

For more information on message center messages, Refer to the Owner's Literature or

Refer to: Warning Chimes - System Operation and Component Description

(413-01 Instrumentation, Message Center and Warning Chimes, Description and Operation).

There are 3 states of engine running load shed:

Load Shed State	Entry Conditions	Impact to Features	Clear Conditions
Load shed 1	If vehicle speed is **below 16 km/h (10 mph)** , and voltage to the PSCM (power steering control module) is less than 11.5 volts or the PSCM (power steering control module) measures current draw greater than 0 amps. If vehicle speed is **above 16 kp/h (10 mph)** , and the voltage to the BCM (body control module) is less than 11.6 volts.	These loads are incrementally reduced (if equipped): Heated steering wheel and climate controlled seats. These loads are turned off (if equipped): smart trailer tow battery charge, heated mirrors, heated backglass, and heated windshield.	Voltage to the BCM (body control module) is greater than 12.7 volts **or** the generator field duty cycle is less than 88%.
Load shed 2 transient	PSCM (power steering control module) indicating reduced voltage and increased current. System voltage less than 11 volts	• If equipped, climate controlled seats are disabled, but the indicators remain illuminated. • If equipped, rear defrost and heated mirrors are disabled, but the indicator remain illuminated.	Voltage to the BCM (body control module) is greater than 12.4 volts.
Load shed 2 continuous	Load Shed 2 Transient condition in excess of 20 seconds	• If equipped, climate controlled seats are disabled and the indicators are off. • If equipped, rear defrost and heated mirrors are disabled and the indicator is off. • If equipped with DATC (dual automatic temperature	Voltage to the BCM (body control module) is greater than 12.4 volts for more than 60 seconds.

to a vehicle ground. Do not connect to the negative battery terminal. Connecting directly to the battery negative terminal bypasses the ability of the vehicle to measure the input current with the battery monitoring sensor, and does not adjust the battery state of charge accordingly. For a convenient ground location look for the body ground cable coming off the clamp or the battery monitoring sensor and try and connect in this location (typically on the shock tower sheet metal). The battery monitoring system calibrates the battery state of charge as described above after about 8 hours if the jump start negative cable is improperly installed.

NOTICE

If the cables are incorrectly connected to the battery negative terminal, DO NOT reset the battery monitoring system using the diagnostic scan tool. This reset is reserved for new battery installation only. This reset will clear the learned battery data, the battery time in service, and will affect the aging algorithm parameters, which have been learned since the installation of the battery.

Battery Replacement

If the vehicle battery is replaced, it is very important to perform the battery monitoring system reset using the diagnostic scan tool. If the battery monitoring system reset is not carried out, it holds the old battery parameters and time in service counter in memory. Additionally it tells the system the battery is in an aged state and may limit the Electrical Energy Management system functions.

Component Description

Generator

The generator is equipped with an electronic internal voltage regulator and a serviceable generator clutch pulley.

Dual Generators

Vehicles with the 3.3L Duratec-V6/5.0L 32V Ti-VCT engines may have dual generators. In dual generator systems, the PCM (powertrain control module) keeps the secondary generator in a standby state where it does not generate current unless the primary generator is generating full power and more current is needed to support the vehicle loads. The PCM (powertrain control module) monitors the output of the primary generator and adjusts the control setpoint of the secondary generator to cause it to provide additional current when needed.

Generator Current Sensor

The generator current sensor is attached to the generator B+ cable. It is supplied a 5-volt reference voltage and a ground from the PCM (powertrain control module) . The generator current sensor is a Hall-effect sensor that supplies an analog feedback signal to the PCM (powertrain control module) . The PCM (powertrain control module) uses this information for battery charging strategy and idle stability and torque control.

Battery Monitoring Sensor

Charging System - 3.5L V6 PowerBoost (CN) - System Operation and Component Description

414-00 Charging System - General Information	***2022 F-150***
Description and Operation	***Procedure revision date: 11/14/2022***

Charging System - 3.5L V6 PowerBoost (CN) - System Operation and Component Description

System Operation

System Diagram

6	TCM (transmission control module)
7	IPC (instrument panel cluster)
8	BMS (battery monitoring sensor)
9	DC (direct current) / DC (direct current) Converter Control Module
10	BCM (body control module)

12V Battery Charging System

The 12V battery is charged by the DC (direct current) / DC (direct current) converter control module. The BMS (battery monitoring sensor) continuously monitors the battery state of charge condition and provides the BCM (body control module) with this information. The BCM (body control module) communicates this information to the PCM (powertrain control module) over the HS-CAN1 (high-speed controller area network 1) . The PCM (powertrain control module) communicates the battery desired setpoint to the DC (direct current) / DC (direct current) converter control module which supplies the necessary charge voltage to the 12V battery. For more information, REFER: 414-05-DC/DC converter control module-DnT

12V Battery Management System

NOTICE

When any vehicle module is being programmed, connect an external battery charger to make sure the module programming is completed without interruption due to the load shedding feature becoming active. The external battery charger must maintain a system voltage above 13 volts. This may require a charger setting higher than the lowest charge setting. The external battery charger negative connection must be made to an engine or vehicle chassis ground and not the negative battery terminal. If the connection is to the negative battery terminal, load shedding may begin and module programming may be corrupted. After charging has begun, start the engine to clear any load shed states and then turn the engine off and proceed with programming.

Charging and Jump Starting

Do not charge or jump start the vehicle by connecting to the battery negative terminal. Refer to the Owners Guide for more information.

If the vehicle has been jump started, test the battery condition. REFER: 414-02-Battery DnT

If the 12V vehicle battery has been charged by connecting to the battery negative terminal, do not reset the Battery Monitoring System.

Charging System - System Operation and Component Description

414-00 Charging System - General Information	***2022 F-150***
Description and Operation	***Procedure revision date: 04/25/2022***

Charging System - System Operation and Component Description

System Operation

System Diagram

6	TCM (transmission control module)
7	IPC (instrument panel cluster)
8	BMS (battery monitoring sensor)
9	DC (direct current) / DC (direct current) Converter Control Module
10	BCM (body control module)

12V Battery Charging System

The 12V battery is charged by the DC (direct current) / DC (direct current) converter control module. The BMS (battery monitoring sensor) continuously monitors the battery state of charge condition and provides the BCM (body control module) with this information. The BCM (body control module) communicates this information to the PCM (powertrain control module) over the HS-CAN1 (high-speed controller area network 1) . The PCM (powertrain control module) communicates the battery desired setpoint to the DC (direct current) / DC (direct current) converter control module which supplies the necessary charge voltage to the 12V battery. For more information,

Refer to: Direct Current/Direct Current (DC/DC) Converter Control Module - Electric - System Operation and Component Description

(414-05 Voltage Converter/Inverter, Description and Operation).

12V Battery Management System

NOTICE

When any vehicle module is being programmed, connect an external battery charger to make sure the module programming is completed without interruption due to the load shedding feature becoming active. The external battery charger must maintain a system voltage above 13 volts. This may require a charger setting higher than the lowest charge setting. The external battery charger negative connection must be made to an engine or vehicle chassis ground and not the negative battery terminal. If the connection is to the negative battery terminal, load shedding may begin and module programming may be corrupted. After charging has begun, start the engine to clear any load shed states and then turn the engine off and proceed with programming.

Charging and Jump Starting

Do not charge or jump start the vehicle by connecting to the battery negative terminal. Refer to the Owners Guide for more information.

The DC (direct current) / DC (direct current) converter control module is responsible for maintaining and charging the 12V battery. It is enabled when the high voltage battery conductors have closed, providing high-voltage power to the DC (direct current) DC (direct current) converter control module. For more information,

Refer to: Direct Current/Direct Current (DC/DC) Converter Control Module - Electric - System Operation and Component Description

(414-05 Voltage Converter/Inverter, Description and Operation).

BCM (body control module)	B11DB:08	Battery Monitoring Module "A": Bus Signal/Message Failures	GO to Pinpoint Test K
BCM (body control module)	B11DB:09	Battery Monitoring Module "A": Component Failures	GO to Pinpoint Test K
BCM (body control module)	B11DB:11	Battery Monitoring Module "A": Circuit Short To Ground	GO to Pinpoint Test K
BCM (body control module)	B11DB:49	Battery Monitoring Module "A": Internal Electronic Failure	GO to Pinpoint Test L
BCM (body control module)	B11DB:55	Battery Monitoring Module "A": Not Configured	GO to Pinpoint Test M
BCM (body control module)	B11DB:9A	Battery Monitoring Module "A": Component or System Operating Conditions	GO to Pinpoint Test K
BCM (body control module)	B130C:12	Load Shed Control Circuit: Short To Battery	GO to Pinpoint Test N
BCM (body control module)	B130C:14	Load Shed Control Circuit: Short To Ground or Open	GO to Pinpoint Test N
BCM (body control module)	B1438:03	Battery Current Sensor: FM (Frequency Modulated) / PWM (Pulse Width Modulated) Failure	GO to Pinpoint Test N
BCM (body control module)	B1489:11	Battery Monitoring System (BMS) Sensor Power: Circuit Short To Ground	GO to Pinpoint Test K
BCM (body control module)	B1513:09	Vehicle Battery "B": Component Failure	GO to Pinpoint Test D

PCM (powertrain control module)	U012F:00	Lost Communication With Generator "B" 24V for PTTB (power to the box) feature : No Sub Type Information	GO to Pinpoint Test H
PCM (powertrain control module)	U042E:00	Invalid Data Received From Generator "A" Control Module: No Sub Type Information	GO to Pinpoint Test G
PCM (powertrain control module)	U044D:00	Invalid Data Received From Generator "B" 24V for PTTB (power to the box) feature : No Sub Type Information	GO to Pinpoint Test H

Global Customer Symptom Code (GCSC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

Global Customer Symptom Code Chart

Customer Symptom	Action
Comfort & Entertainment > Audio > Radio FM > Sound Quality	GO to Pinpoint Test J
Driver Aides & Information > Warning Indicators/Messages/Chimes > Charging System > Stays On	GO to Pinpoint Test A

Inspection and Verification

1. Verify the customer concern by operating the charging system.
2. Before diagnosing or repairing the charging system inspect the following items:

- Check the battery for loose, damaged or corroded connections.
- Check the generator for loose, damaged or corroded connections.
- Check engine and battery grounds for loose, damaged or corroded connections.
- Check high current BJB (battery junction box) for loose or corroded connections.
- Verify fuses or fusible links.
- Inspect wiring, terminals and connectors.